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Southern Extension of the Range of the Del Norte Salamander in California

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The range of the Del Norte salamander, *Plethodon elongatus,* as currently recognized, consists of a narrow coastal strip in the humid Transition Life-zone extending from southern Del Norte County, California, to the Rogue River Basin, Curry County, Oregon, a distance, in an air line, of approximately 90 miles. The species has so far been reported only in areas within a few miles of the coast, largely in the most humid section of the redwood belt. Its discovery 25 miles inland, well interior to the redwood belt and 40 miles south of Requa, the southernmost published record of occurrence, is worthy of note.

On February 14, 1947, 8 individuals were found in a rock slide on the south side of U. S. Highway 299, 300 yards west of Boise Creek, about 2 miles west of the town of Willow Creek, Humboldt County, California. The rocks, among which the animals occurred, were part of a talus that had formed above the highway, apparently as a result of slumping along a road cut. The rocks had evidently been in repose for some time and roots of scattered ferns and a maple tree were found in the fine soil below the superficial layer. The talus measured about 50 feet along its base and approximately 30 feet at its greatest height. It faced to the north and sloped at an angle of about 45°. The rocks were dark colored, primarily from 2 to about 5 inches in greatest dimension, generally somewhat rounded, and without sharp edges. Numerous openings among them permitted the animals' deep penetration of the substratum.

The surrounding forest consisted chiefly of Douglas fir, with scattered bay, madrone, tan oak, and maple. Seepage from the well forested slope above into the talus probably makes possible occurrence of the salamanders there even in summer. In the loose material they can seek depths at which moisture and temperature conditions are favorable.

All but one individual was found by digging in the talus. This one was discovered under a stone, approximately one foot in diameter, on the hillside near the upper margin of the rock slide. The animals were found at various depths to a maximum of about 14 inches. When exposed, they sought refuge in openings among the rocks, wriggling into the ground by lateral undulations of the body.

The snout-vent lengths (in mm.) of those obtained were ♂61, ♀59, ♂52, ♀48, 42, 20, 20. The two juveniles were probably young of the year. There was progressive loss of the longitudinal dorsal stripe with increase in size, the young having well defined pinkish bands and the largest male lacking the dorsal marking. In coloration, the animals fit the description of the type and paratypes from Requa, Del Norte County, California. Since there is no reference to eye color in the literature, it should be pointed out that the iris was dark brown (black on casual inspection) with a few scattered silvery guanophores, most abundant in the upper portion.

The occurrence of *Plethodon elongatus* in the vicinity of Willow Creek might be expected from the topography of the area. A long straight canyon runs diagonally from the coast to the southeast. In it flows the Trinity River, a tributary of the Klamath, and the coastal portion of the Klamath River. It presents an avenue for interior extension of humid coastal conditions. Although they do not reach the Willow Creek region, redwoods extend farther inland in this section of the coast than elsewhere. The presence of the Olympic salamander, *Rhyacotriton olympicus* in a tributary of Willow Creek (probably Boise Creek), recently reported (see Myers, G. S., Copeia, 2, 1943:125), is further indication of favorable conditions of humidity and temperature. The ranges of *Plethodon elongatus* and closely related species, *dunni* and *vandykei,* collectively conform to that of *Rhyacotriton. Elongatus* might have been expected on the basis of the presence of the latter. Incidentally, an adult Olympic salamander was found by us beneath a stone within a few inches of the cascading waters of Boise Creek. We can thus confirm Myers' report of its occurrence.

Other localities for specimens of *Plethodon elongatus* south of the type locality, which apparently is the southernmost previously reported station, are as follows: Collection of the California Academy of Sciences: 5 mi. SE Requa, Del Norte County; 8 mi. N, vicinity E, and 2 mi. E of Klamath, Humboldt County. Stanford University Natural History Museum: Klamath-Klamath Glen road, about 500 yds. E Turwar Creek Bridge, Del Norte County. Museum of Vertebrate Zoology: 4 mi. N and 1½ mi. E Orick, 50 ft., Humboldt County.

In view of the occurrences herein reported it seems likely that the range of the Del Norte salamander will be found to extend farther inland than is now known. Ease in collecting along the coastal highway has limited search for animals in north coastal areas. With knowledge of the proclivity of this amphibian for "rock rubble," a designation used by Joseph Slevin, veteran collector, in referring to the habitat of this species, further investigation of such situations may reveal a somewhat broader area of distribution.

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Bibliography of the Crocodilia

By ALBERT M. REESE

The author makes no claims for completeness in this bibliography. Some of it has been systematically worked up through the literature; the rest of it was acquired in the course of his researches in this group, during many years.

A number of the references are not as exact as could be desired. This was often caused by the difficulty of access to some of the foreign and less well-known journals.

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First Records of the Red-Brown Loggerhead Turtle From the Eastern Pacific

By CHARLES E. SHAW

The absence of definite records of the occurrence of the loggerhead turtle, *Caretta caretta* (L), in the eastern Pacific Ocean has lately been commented upon by Schmidt (1945, Marine Life, Occas. Papers, 1: 9). This disparity in the distribution of *Caretta* as contrasted with the distributions of the other genera of Pacific marine turtles has been eliminated by the recent collection of two specimens definitely assignable to the genus. The collection of these, one from near the head of the Gulf of California, Mexico, and the other from near San Clemente Island, Los Angeles County, California, not only substantiates Schmidt's anticipation of the possible discovery of this genus off the Pacific Coast of the Americas, but also adds a third marine turtle to the herpetofaunal list of California, which has hitherto included only the leatherback (*Dermochelys*) and green turtle (*Chelonia*) as occasional visitors to the coastal waters of this state.

The head, carapace, plastron and limbs of the loggerhead from the Gulf of California, Mexico, were purchased from fishermen at San Felipe, Baja California, by Dr. Carl L. Hubbs and Mr. L. W. Walker on April 4, 1947. This specimen, with a carapace length of 34½ inches, was taken in a shrimp trawl between Bahia Ometepec and the Colorado River. Dr. Hubbs' notes record the statement of a Señor García that this individual was the second or third he had seen in years, while others reported loggerheads to be common 80 or 90 miles to the south. Contrary to these latter remarks, another person declared that sea turtles are rare at San Felipe, and that *Caretta* is rare even to the southward. The discrepancy between reported abundance and rarity of this turtle may be due in part to confusion of the observers as to the correct identity of the various species known to inhabit the Gulf of California.

Distinguished locally from the green turtle as being "mas bravo," the loggerhead has been given the name "cahuama* javelina," or wild-pig turtle, by the Mexican fishermen because of its ferocious disposition.

On August 10, 1947, Mr. Dick Shively of the boat Hulda I gaffed a loggerhead while the turtle apparently was sleeping on the surface 35 miles west southwest of San Clemente Island, Los Angeles County, California. This was an adolescent with a carapace length of 24¾ inches.

The following is a tabulation of the more important characters of scutation of these two turtles:

*Mayo indian word for "sea turtle." The Mayos occupy the coast of Sinaloa. They are fishermen. The warlike Yaquis as well as the Yumas to the north, may have adopted the word. (Ed.)

	carapace color	vertebrals	costals	marginals	enlarged, poreless inframarginals	mandibular scutes
			R - L*	R - L	R - L	R - L
Gulf of Calif.	red-brown	5	5 - 5	12 - 14	3 - 3	3 - 3
San Clemente Id.	red-brown	5	5 - 5	13 - 13	3 - 3	3 - 3

The carapace osteology of the two specimens is as follows:

	neurals	costals	marginals	ribs enter marginals	suprapygals
		R - L	R - L		
Gulf of Calif.	8	8 - 8	11 - 13	R 3-8 + 10-11 L 5-10 + 12-13	1
San Clemente Id.	10	8 - 8	12 - 11	R 4-9 + 11-12 L 3-8 + 10-11	2

*R—right
L—left

In the turtle from the Gulf of California, the series of neural bones is not broken by the interruption of costal bones and the seventh and eighth pairs of costal bones are contiguous dorsally. The San Clemente Island specimen has the neural series interrupted by the middorsal contact of the eighth pair of costal bones, which interpose themselves between the ninth and tenth neurals. If *Caretta caretta gigas* Deraniyagala is to be considered a valid race, it is possible that the eastern Pacific population of *Caretta* should be nomenclaturally associated with that subspecies, at least on the basis of the interruption of the neural series by the costal bones in the loggerhead from near San Clemente Island.

The peculiar sea turtle which was reported (1946, Herpetologica, 3: 124) from the northwestern coast of Baja California, Mexico, has a red-brown carapace coloration, a character reported to be quite constant for *Caretta*. However, this specimen was identified as an aberrant *Lepidochelys* because of the presence of 4 enlarged inframarginal plates, one of which was pore-bearing. To my knowledge, no *Caretta* has yet been found to possess more than 3 enlarged inframarginals. The inframarginal plates in the genus are also invariably poreless. It is possible that the specimen might have been equally well identified as an anomalous *Caretta*, or that it may perhaps even represent a hybrid between the two genera *Lepidochelys* and *Caretta*. This turtle is still living at the San Diego Zoo so that a more reliable determination of its generic identity from an examination of osteological characters of the skull and carapace cannot be made as yet.

ZOOLOGICAL SOCIETY OF SAN DIEGO, SAN DIEGO 12, CALIF.

Effect of a Bite by *Sistrurus* on *Crotalus*

By D. F. MUNRO

A female *Sistrurus miliaris streckeri* was captured in Northwestern Arkansas in September, 1946. It was about 15 inches long, with two rattles (the button missing), and well-fed. It did not eat in captivity until the following spring, when it began accepting frogs, and later, chopped horsemeat. During the first two months of captivity it was very nervous and pugnacious, striking at other snakes which passed in front of its cage, and leaving drops of thick yellow venom on the wire netting (it always failed to hit the intended victim through the screen). During the winter, though kept at room temperature, it retired into a small box in its cage and rarely showed itself until March. It then seemed less nervous, but little less pugnacious. Having grown an inch or so, it shed its skin on May 28, acquiring a new segment in its rattle.

A male *Crotalus horridus horridus* was captured in North Central Kansas in May, 1947. It was a scant foot in length, equipped with button only. It was kept a few weeks in a large cage with some Copperheads and a larger Timber Rattler, and later alone in a small wire-fronted cage like that of the Pigmy Rattler. From the first it was mild-tempered, but restless, and refused food.

On June 25 the Pigmy Rattler, which had been less nervous during the preceding weeks, and which had been fed a frog and some horsemeat on June 15 and a small mouse on June 16, was put in the cage with the Timber Rattler, while its own cage was being cleaned. Both snakes became uneasy and prowled about for a minute or two, crawling over each other, but without signs of hostility. Suddenly the Pigmy bit the Timber Rattler fiercely an inch or two ahead of midbody, retiring immediately to a far corner of the cage, where it was caught and removed.

As soon as the Pigmy struck, the Timber Rattler started wriggling about rapidly and rather aimlessly, making no effort to retaliate. Two drops of blood appeared on its back, about half an inch apart and two scale rows down the right side from the mid-dorsal row. The snake was put in water to wash off the blood. It was then returned to its cage, and went into hiding under a shelf. It was uncovered for inspection several times that day and the next, and when so disturbed, it crawled around as usual, but soon went beneath the shelf again. After the second day it resumed its normal behavior.

At no time after the injury was any swelling apparent, and in fact the location of the perforations was not detectable after the blood had been washed away. If, as seems likely from the vigor of the bite and from the Pigmy Rattler's customary readiness to eject venom, a normal amount of poison had been injected into the considerably smaller Timber Rattler, it is evident that the venom of the Pigmy Rattler does not have serious effects on the Timber Rattler.

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*designates Fellow.

* * * *

Resignation

Mr. C. M. Bogert, formerly president of the Herpetologists League, has announced his resignation as an officer and member of the League, 2 Oct., 1947. Vice-President, Dr. Hobart M. Smith, is to act as President until the election of new officers at the end of the year.

Food Habits of *Aneides ferreus*

By ROBERT M. STORM and ALVIN R. ALLER

A total of sixty-three stomachs of the clouded salamander, *Aneides ferreus*, were collected and examined during 1946 and early 1947. The collecting was distributed as follows: 20 specimens were collected in the period from April 6 to May 3, 36 in the period from July 7 to August 20, and two and five respectively on November 6, 1946 and February 2, 1947. Specimens were taken at various times between noon and 6:00 P.M., but no attempt was made in this study to correlate time of day with feeding habits. It would seem apparent that some food is taken during the day, since nocturnal feeding only would probably leave the stomach empty by noon. The salamanders were killed in the field by the use of a chloretone solution, in all cases within one hour after collecting. Total lengths ran from one and three-eighths inches to four and three-fourths inches. The average length of 63 individuals was approximately three inches. Stomachs only were removed and opened in the laboratory, and the contents were identified and counted. Identification of organic content was made to family when possible, and otherwise to order. Food specimens beyond recognition were classified as unknown.

Following is a list of the Order and Family groups represented in the stomach contents. Figures given are the total number of each organism found, and the percentages of the total number of stomachs (63) in which each group was found.

CLASS	ORDER	FAMILY	NUMBER	PERCENTAGE
Crustacea				
	Isopoda		19	14%
Chilopoda			2	3.2
Diplopoda			4	1.6
Insecta				
	Collembola		11	3.2
	Orthoptera			
		Blattidae	2	3.2
	Isoptera			
		Kalotermitidae	14	11
	Hemiptera			
		Tingidae	5	8
		others	3	4.8
	Homoptera		1	1.6
	Dermaptera			
		Forficulidae	10	6.4
	Coleoptera			
		Adults	22	29
		larvae	4	6.4
	Diptera			
		Culicidae	1	1.6
		larvae	7	8

	Hymenoptera		
	Formicidae	258	57
Arachnida			
	Araneida	21	19
	Pseudoscorpionida	2	3.2
	Acarina	23	19
Unknown			
Adults		14	14.2
Larvae		3	3.2
Empty or with wood particles and jelly			11

Aneides ferreus lives primarly in rotting fir logs in open clearings, and its food is evidently a general sampling of the smaller arthropods that favor such a habitat. Ants appear to be the favored food, having been found in 57% of the stomachs. Ants commonly occur in small colonies in these down logs, and probably provide the easiest food source. Termites are also common, and one would expect a greater percentage of these to be eaten, but it is quite possible that many termites were overlooked because of disintegration of their soft body parts.

A computation was made of the number of organisms consumed per inch of salamander, separating the salamanders collected into spring, summer, and winter groups. These figures are as follows: 3.56 for the spring group, 1.03 for the summer group, and 2.8 for the winter group (7 specimens). The small number of stomachs examined in the winter group tends to make this figure unreliable. However, the difference between the numbers 3.56 and 1.03 must indicate less feeding activity in the summer months. This is borne out by the fact that the salamanders appear to move around less during the dry summer months.

The capacity of one stomach is indicated somewhat by the contents of one 4⅝ inch specimen, collected May 3, which contained 50 ants, averaging 3½ mm. in length. A last fact of interest is that a number of stomachs contained varying amounts of wood particles. A few stomachs were filled with a white gelatinous material imbedded throughout with wood particles.

In summary, *Aneides ferreus* probably feeds at random on the smaller arthropods found within the logs in which they dwell. Numbers and availability of the food forms produce the differences in amounts and types consumed.

OREGON STATE COLLEGE, CORVALLIS, OREGON

Eggs and Young of *Aneides ferreus*

By ROBERT M. STORM

A single description of the deposited eggs of *Aneides ferreus,* the clouded salamander, occurs in the literature (Dunn, E. R. Copeia, 1:52. 1942). On July 7, 1946, the writer found two egg clusters of this species some 4 miles west of Philomath, Benton County, Oregon. Both clusters were within a rotting Douglas Fir log, about two feet in diameter, which lay on an exposed southern slope, surrounded for at least 50 yards

by low herbaceous growth, largely grasses. The exterior of the log was fire-charred.

The first cluster, containing 17 eggs, was approximately six inches below the southern surface of the log, and some 8 inches from the ground. The eggs hung in a grape-like cluster from a small fiber of undecayed wood which ran through the cavity, the cavity being approximately three inches high by six inches long. Within the cavity, and remaining with the eggs even after they were exposed, were two adults. Laboratory examination proved these to be a male, 125 mm. long, and a female, 110 mm. long.

A second cluster of nine eggs was found in a similar cavity (approximately two inches high by five inches long), some two feet west of the first. In this case, the eggs were attached to the roof of the cavity. These eggs likewise were accompanied by a pair of adults, a male 99 mm. in length, and a female 104 mm. in length.

The eggs averaged close to five millimeters in diameter, and appeared to have a milky yellowish gelatinous covering, which continued from one end in a strand about three-fourths of an inch long. The strands from all eggs twisted about and adhered to one another toward the point of attachment. The eggs proper were light cream colored at the attachment end, with a slight brownish-orange bloom toward the free end, apparently due to wood dust particles.

Eggs and adults were brought into the laboratory, and with the exception of a few eggs, were set up in a vivarium. However, the adults paid no attention to the eggs here, and these then molded. Their gradual disappearance indicated that they were being eaten by the adults. The few eggs, which were examined rather macroscopically, showed no evident signs of embryonic development, and it was assumed that they had been deposited very shortly before their discovery. This assumption was borne out to some extent by the following experience.

A female Aneides, collected on May 23, 1946, showed ovarian eggs, visible through the abdominal wall. She was placed in a small terrarium with a considerable amount of sphagnum moss, and on either July 6 or 7, 1946, she deposited 13 eggs in a gourd-shaped hollow, which she constructed in the moss. The eggs were not in a cluster, but were attached singly or in groups of two and three to strands of moss. On July 9, these eggs measured 4.5 mm. in diameter. The female remained in the cavity with the eggs at all times, and it was only when the set-up was roughly disturbed two weeks later that she deserted them. The eggs then began to mold, all except two being destroyed. The female returned to these two.

On August 20, 1946, a cluster of eight eggs was found in the same log as were those of July 7. These were in an opening four inches below the southern surface, and no adults were present. Living embryos were apparent through the translucent egg membranes, and one was removed and measured, having a total length of 19.5 mm. Two eggs were preserved, and the remaining five were placed with the female and her two eggs, mentioned in the preceding paragraph. She remained near these seven eggs until their hatching.

During the afternoon of September 8, 1946, the first of these seven eggs hatched. No more emerged on the 9th, but by 9:30 A. M. on the 10th, a second young was out, and a third was half way out of its shell, the process being completed by 10 A. M. At 9 o'clock that evening, a fourth had emerged. At 9:30 A. M. on September 11, the 5th young was as yet unhatched, but by 9:30 P. M., this fifth one was out. No observations were made again until September 16, and on that day at 5 P. M., all seven young were hatched and near the adult. The next morning, the female had left the nest area, but six young were still within it. Three young were measured and found to average 25 mm. in total length. A description of the coloration follows.

Dorsal ground color, a deep chocolate brown. A brass-colored dorsal stripe, formed by close-set small flecks, begins just back of the head and extends down the back, averaging 1.5 mm. in width to the base of the tail, where it narrows and intensifies in color to the tip of the tail. Each side of the trunk shows about 20 small white flecks on a chocolate ground color. The dorsal part of the head is dark brown, with minute brassy flecks, except for a brass-colored triangle with apices at eyes and snout. The limbs are dark brown dorsally, except for the proximal portion of each, which is a solid area of brassy coloration. For the first three to four days, the median ventral area shows the remains of the yolk sac quite clearly. Later, the ventral side is grayish-black, sparsely flecked with minute white flecks. The viscera are apparent through the thin abdominal wall.

OREGON STATE COLLEGE, CORVALLIS, OREGON.

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PERSONAL INTRODUCTIONS. Our generous Fellow, Mr. Earl C. Martin, of Ocala, Florida, has offered to make "thumb-nail" cuts of authors to accompany their articles. Please send in your photo NOW so that the cut may be on hand. Mr. Martin has also offered to make larger halftones of herpetologists to accompany biographies. We will gladly publish a biography of your favorite herpetologist. Send in his photo with your MS. Don't wait for him to die—write it now.

* * * *

HERPETOLOGISTS LEAGUE TO CONTRIBUTE TO "SCIENCE ON THE MARCH"

Dr. F. L. Campbell has requested the Herpetologists League to contribute annually an article of about one thousand words, illustrations optional, for publication in the "Science on the March" section of the Scientific Monthly. This article should, we believe, reflect herpetological contributions to science and civilization during the year 1947. The Officers of the H.L. request the Members to submit manuscripts or outlines of such an articie. The best will be forwarded to Dr. Campbell. MS must be submitted before Jan. 31, 1948.

Recent Herpetological Literature No. 5

Compiled by ALBERT G. SMITH

Barrett, William C.
1947. Hematopoiesis in the European plethodontid, Hydromantes italicus, with reference to phylogeny. Anat. Rec., 98, no. 2: 127-136.

Barton, A. J.
1947. An albino garter snake from Pennsylvania. Copeia, 1947, no. 2: 140.

Blair, A. P.
1947. Defensive use of parotid secretion by *Bufo marinus*. *Ut supra*: 137.

Brock, Vernon E.
1947. The establishment of *Trionyx sinensis* in Hawaii. *Ut supra*: 142.

Brooksma, H. E.
1947. Hybridization in Triturus. I. Description of a method by which reciprocal hybrids from *Triturus taeniatus* and *Triturus alpestris* can be obtained. Jour. Genetics, 48, no. 2: 219-222.

Brown, Bryce C.
1947. *Natrix rigida* in Texas. Herpetologica, 4, no. 1: 23.

Brown, Bryce C., and M. B. Mittleman
1947. A range extension for *Crotalus m. molossus*. *Ut supra*: 23-24.

Christenson, A. K.
1947. Feeding habits of *Gerrhonotus*. *Ut supra*: 2.

Colbert, Edwin H., R. B. Cowles, and C. M. Bogert
1947. Rates of temperature increase in the Dinosaurs. Copeia, 1947, no. 2: 141-142.

Darling, Donald
1947. Northwest herpetology contributions. Herpetologica, 4, no. 1: 28.

Dundee, Harold A.
1947. Notes on salamanders collected in Oklahoma. Copeia, 1947, no. 2: 117-120.

El-Toubi, M. R.
1947. Some observations on the osteology of the lizard, Agama stellio (Linne). Jour. Morph., 81, no. 2: 135-149, fig. 1-8.

Evans, Howard E.
1947. Herpetology of Crystal Lake, Sullivan County, N.Y. Herpetologica, 4, no. 1: 19-21.

Fowler, J. A.
1947. Record for *Aneides aeneus* in Virginia. Copeia, 1947, no. 2: 144.

Franklin, Malcolm A.
1947. An inexpensive snare for water snakes. *Ut supra*: 143.

Gallego, A., and R. Lorente de No
1947. On the effect of several monovalent ions upon frog nerve. Jour. Cell. and Comp. Physiol., 29, no. 3: 323-332.

Green, John D.
1947. Vessels and nerves of amphibian hypophyses. A study of living circulation and of the histology of the hypophysical vessels. Anat. Rec., 99, no. 1: 21-53, pls. 1-4.

Gudger, E. W.
1947. Is the sting ray's sting poisonous to vertebrates other than men and fishes. Amer. Nat., 81, no. 799: 297-307, fig. 1-4.

Haas, Georg
1947. Jacobson's organ in the chameleon. Jour. Morph., 81, no. 2: 195-205, pls. 1-2.

Hamburger, Viktor
1947. Monsters in Nature. Ciba Symposia, 9, no. 5 & 6: 666-683, fig. 1-21.

Harper, Francis
1947. A new cricket frog (*Acris*) from the Middle Western States. Proc. Biol. Soc. Wash., 60: 39-40.

Hoopes, Isabel
1947. Notes on the spadefoot toad in captivity. Copeia, 1947, no. 2: 138-139.

James, Maurice T., and T. Paul Maslin
1947. Notes on the myiasis of the toad, *Bufo boreas boreas*, Baird and Girard. Jour. Washington Acad. Sci., 37, no. 10: 366-368, fig. 1.

Kaushiwa, Brahma S.
1947. Partial hermaphroditism in the common Indian Frog, *Rana tigrina*. Copeia, 1947, no. 2: 137.

Knowlton, George F.
1947. The sagebrust swift in pasture insect control. Herpetologica, 4, no. 1: 25.

Ladd, Doyt E.
1947. Size of adult *Eurycea l. longicauda* (Green). *Ut supra*: 2.

Langebartel, Dave A.
1947. Snakes collected at Camp Eastman, Hancock County, Illinois. *Ut supra*: 27-28.

Liu, Ch'eng-chao
1947. Two new frogs of the genus *Scutiger* from West China. Copeia, 1947, no. 2: 123-126, fig. 1-2.

Loveridge, Arthur
1947. Bone-making material for turtles. *Ut supra*: 136.

Loveridge, Arthur, and Benjamin Shreve
1947. The "New Guinea" snapping turtle (*Chelydra serpentina*). *Ut supra*: 120-123, fig. 1.

Mahendra, Beni Charan
1947. Contributions to the bionomics, anatomy, reproduction and

development of the Indian house gecko, *Hemidactylus flaviviridis* Rüppel. Part IV. The respiratory and vocal organs. Proc. Indian Acad. Sci., 25, B, no. 3: 57-73, fig. 1-9.

Maldonado-Koerdell, Manuel, and Irwin L. Firshein
1947. Notes on the ranges of some North American salamanders. Copeia, 1947, no. 2: 140.

Maslin, T. Paul
1947. Range extensions of three reptiles in Colorado. *Ut supra*: 138.

McCutcheon, Frederick H.
1947. Specific oxygen affinity of hemoglobin in elasmobranchs and turtles. Jour. Cell. and Comp. Physiol., 29, no. 3: 333-334, fig. 1-3.

Neill, Wilfred T.
1947. Range of *Pituophis m. melanoleucus restricted*. Herpetologica, 4, no. 1: 29-30.

Nelsen, Olin E.
1947. Oxygen and air pressure effects upon the early development of the frog's egg. Science, 106, no. 2752: 295-296.

Perkins, C. B.
1947. A note on the longevity of amphibians and reptiles in captivity. Copeia, 1947, no. 2: 144.

Pope, Clifford H.
1947. A new pelobatid frog from Fukien Province, China. *Ut supra*: 109-112.

Prado, G. Leal
1947. Effect of adrenalin and insulin on the blood sugar of Ophidia (Bothrops jararaca). Revue Canad. Biol., 6, no. 2: 255-263, figs. 1-3.

Ramsey, L. W.
1947. Feeding behavior of *Tropidoclonion lineatum*. Herpetologica, 4, no. 1: 15-18.

Raney, Edward C., and Ernest A. Lachner
1947. Studies on the growth of tagged toads (*Bufo terrestris americanus* Holbrook). Copeia, 1947, no. 2: 113-116.

Roberts, Allen R. and Jack Quarters
1947. *Sistrurus* in Michigan. Herpetologica, 4, no. 1: 6.

Romer, Alfred S.
1947. The relationships of the Permian reptile Protosaurus. Amer. Jour. Sci., 245, no. 1: 19-30, fig. 1.

Schmidt, K. P., and C. M. Bogert
1947. A new fringe-footed sand lizard from Coahuila, Mexico. Amer. Mus. Novitates, no. 1339: 1-9, fig. 1-4.

Slevin, Joseph R.
1947. An abnormal condition in the transparent spectacle of a coast gopher snake. Herpetologica, 4, no. 1: 30.

Smith, Hobart M.
1947. Subspecies of the Sonoran toad (*Bufo compactilis* Wiegmann). *Ut supra*: 7-13, fig. 1.
1947. *Microhyla carolinensis* in Kansas. *Ut supra*: 13-14.
1947. Opisthoglyph terminology. *Ut supra*: 14.

Smith, Hobart M., and Bryce C. Brown
1947. The Texan subspecies of the tree frog, *Hyla versicolor*. Proc. Biol. Soc. Wash., 60: 47-50.

Stickel, William H., and James B. Cope
1947. The home ranges and wanderings of snakes. Copeia, 1947, no. 2: 127-136.

Stille, W. T.
1947. The aquatic habits of *Cnemidophorus sexlineatus*. *Ut supra*: 143.
1947. *Kinosternon subrubrum subrubrum* in the Chicago Region. *Ut supra*: 143.

Taylor, Edward H.
1947. Publication dates of Kelaart's Prodromous Fauna Zeylanica. Herpetologica, 4, no. 1: 26.

Turner, R. S., and F. A. Fuhrman
1947. Modification of the action potential of amphibian nerves by Triturus embryonic toxin. Amer. Jour. Physiol., 150, no. 2: 325-328, fig. 1-6.

Wheeler, George C.
1947. The amphibians and reptiles of North Dakota. Amer. Midl. Nat., 38, no. 1: 162-190.

Wolff, Etienne
1947. Essai d'interpretation des resultats obtenui recemment chez les Vertebres sur l'intersexualite hormonale. Experientia, 3, no. 8: 301-304.

Wolfgang, von Hagen, Victor
1947. Rafinesque, the unnatural naturalist. Nat. Hist., 56, no. 7: 296-303, ill.

Wood, John T., and William E. Duellman
1947. Preliminary herpetological survey of Montgomery County, Ohio. Herpetologica, 4, no. 1: 3-6.

Woodson, Weldon D.
1947. Toxicity of Heloderma venom. *Ut supra*: 31-33.

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THE INDEX to Vols. I, II, and III, prepared by Mr. Albert G. Smith of Loyola University, Chicago, is distributed gratis to subscribers to Vol. IV. Others may procure it for 25 cents in stamps.

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DEMAND FOR BACK ISSUES. Any person having back issues of Herpetologica for sale please notify the Editor.

Distribution of Two Salamanders in Virginia

By RICHARD L. HOFFMAN

Recent examination of several herpetological collections as well as personal field work prompts the publication of the following notes on the ranges of two salamander species in Virginia. The information at hand necessitates some changes in the distributional maps of Dr. Bishop's *Handbook of Salamanders,* Ithaca: Comstock Publ. Co., 1943. Although the modifications are not great, they involve physiographic and ecological factors.

I am indebted for permission to study collections under their charge to Dr. Doris M. Cochran, U. S. National Museum (USNM); Dr. Paul R. Burch, Radford College (RC); Mr. M. Graham Netting, Carnegie Museum (CM); Mrs. F. M. Uhler, U. S. Fish and Wildlife Service (USFWS); and Dr. Harry G. M. Jopson, Bridgewater College (BC). Mr. James A. Fowler and Mr. Lewis Wright have very generously made available notes and specimens from their personal collections, indicated by JAF and LW.

Ambystoma opacum (Gravenhorst)

In Virginia, this species is common in the Coastal Plain, and there are a few records for the Piedmont Plateau. It is now possible to add three localities in the Valley and Ridge Province, as follows:

Allegheny County: one mile north of Clifton Forge, RLH 1099;

Rockingham County: Rawley Springs, ten miles west of Harrisonburg, BC (larvae); Endless Caverns, BC (adult).

Unfortunately, two of these records are based on immature specimens, but no doubt is felt about the identifications. The Clifton Forge record is based on many larvae and one transformed individual. The locality from which they came is a small pond in an extensive shale region. Until recently, apparently, this pond was a bend in a nearby creek which has since shortened its course and left most of the bend isolated. The usual amphibian fauna of a woodland pond is abundant there. On January 27, 1947, I investigated the region at night, and was surprised to find well-developed ambystoma larvae in the pond. A specimen was obtained and raised to transformation, which took place on May 5. This early date is attributable to a constant food supply and warm temperature. At that time, free larvae still had large gills, and transformation in the native state did not commence until around the first of June. Despite several years of collecting around the pond, at all seasons, I have so far been unable to find the adult stage, although *A. opacum* is not as secretive as most members of the genus and on the Coastal Plain is frequently found in swamps and such places. The Bridgewater College specimen from Endless Caverns is possibly from some nearby place and not from the caverns themselves, which are commercialized and would not offer the concealment to be found at an undeveloped cave.

Bishop's map of *opacum (op. cit.,* p. 148) shows an unrepresented

area in western Virginia, North Carolina, and eastern Tennessee, which is, in the first named state, largely negated by the foregoing records. I believe that *opacum* will be found, as a relict form, at other places in western Virginia where there are small ponds suitable for its requirements.

Pseudotriton montanus montanus Baird

Dr. Bishop's map *(op. cit.,* p. 379) and range statement in the text indicate that this subspecies occurs in the Piedmont and mountains from southern Pennsylvania to South Carolina and Georgia, with a slight Coastal Plain infringement in Maryland. It appears that in Virginia, at least, an adjustment needs to be made. The following records are available:

Brunswick County: Crichton, USNM 5949; *Charles City County*: Westover, LW 112-114; *Fairfax County:* Mount Vernon, USNM 73603-11, CM 16831-32; *King George County*: Aylett, RC (1); *Nansemond County:* Cohoon Pond, near Suffolk, USFWS H.1731; *New Kent County:* near Lanexa, CM 18629 (8), 18638-39 (7), 18940-41, 19045-46, 22701; *Nottoway County:* near Crewe, CM 8893; *Prince William County:* mouth of Neabsco Creek, JAF 166, RLH 648; *Stafford County:* Aquia Creek at U. S. Rt. 1, JAF 917.

With two exceptions (the Brunswick and Nottoway county records), all of the foregoing localities are in the Coastal Plain. Crichton and Crewe, although on the Piedmont, are quite near the Fall Line. I have visited both places, and find that ecological situations similar to those of coastal swamps are represented there.

The Nansemond County specimen, collected by Mr. Uhler, was found "under a log in small, springy stream." Mr. Wright tells me that his specimens from Charles City County "were taken from under a large log in a spring, in pine woods." The Prince William County locality is on the Potomac River, and the specimens were found there under debris in tidal flats. The list of localities alone suggests a preference by the species for lowland swamps. The possibility that *montanus* will be found in the Piedmont Plateau in Virginia cannot be precluded, although three seasons of fieldwork in Albemarle County and elsewhere by the writer, as well as others, have failed to reveal it there. The evidence of ecological preferences and lowland range suggests that over the majority of its range, *m. montanus* is a salamander of the Coastal Plain, and also casts some doubt on the authenticity of South Mountain, Pennsylvania, as a record for the species. It has not been rediscovered in Pennsylvania, nor has extensive field work in Maryland by J. A. Fowler revealed it outside the Coastal Plain in that state. In North Carolina, Brimley (1939, Carolina Tips, 2(5): 19) indicated a "state-wide distribution east of the mountains" including five counties in the Coastal Plain although Bishop's map shows only the Piedmont as inhabited by *m. montanus*.

CLIFTON FORGE, VIRGINIA

An Unusual Method of Shedding

By ROBERT G. HUDSON

The phenomenon of periodic skin shedding by snakes has been often observed and recorded. In most instances the snakes have been found to follow a more or less standard procedure. On April 23, 1947, however, I observed the sloughing of a ten-inch Common Sand Viper, *Cerastes vipera* (Linné), in which the method employed was unusual enough to warrant a brief description.

Prior to the ecdysis I had not noticed any of the usual signs associated with shedding. Normal preliminaries involve a general suppression of color and pattern and the eyes become fogged or cloudy. Possibly the rough scalation and light hues of the snake caused me to overlook this. My attention was attracted to the snake by the continuous opening and closing of the mouth. Closer observation revealed that shedding had started and the movements of the lips were expediting the process. When the mouth was agape, the labial scales moved as if in an effort to help cast off the slough. On several occasions the fangs were lowered when the mouth was opened. After the old skin had passed the neck its progress was accelerated by repeated sideward movements of the body. These, which might be described as twisting actions, began at the neck and progressed posteriorly. A similar type of exertion is also used by the snake as it burrows into sand, but on this occasion it remained on the surface. Like many other snakes, the *Cerastes* experienced difficulty in shedding the skin covering the anal plate, but after the employment of several vigorous body movements it was passed. Throughout the entire period of shedding the snake remained in an area not exceeding 4 x 4 inches. The entire skin was shed within 36 minutes of the time the phenomenon was first observed.

PHILADELPHIA ZOOLOGICAL GARDEN.

* * * *

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Dr. H. T. Gier, Kan.S.T.C., Manhattan, Kan.
Dr. T. Paul Maslin, Dept. Biol., U. of Colo., Boulder, Colo.
Mr. Robert H. McCauley, Jr., 314 Kinzie Ave., Savannah, Ga.
Mr. James A. Slater, Dept. Zool., Iowa State College, Ames, Iowa.
Mr. Albert G. Smith, Dept. Biol., Loyola U., Chicago 37, Ill.
Mr. John Werler, San Antonio Zool. Soc., 622 E. Quimby St., San Antonio 6, Tex.
Mr. John T. Wood, P.O. Box 102, Carrollton, Ohio.

* * * *

*Mrs. Grace Olive Wiley has been elected a Fellow.

HERPETOLOGICAL LEAFLETS published by the University of Colorado Museum. No. 1 Guide to the Snakes of Colorado, Mr. W. Harry Jones-Burdick, 1939, 11 pp. No. 2 Guide to the Amphibia of Colorado, Dr. Hugo G. Rodeck, 1943, 8 pp. No. 3 Guide to the Lizards of Colorado, Dr. T. Paul Maslin, 1947, 14 pp. Fifteen cents each. These leaflets are meant for beginners and interested persons. Each contains an introduction, followed by a serviceable key and then a description of the species. Instructions on shipping and preserving are added. There are sufficient clear illustrations to make identifications easy. Order from Dr. Hugo G. Rodeck, Director, U. of Colo. Museum, Boulder, Colo.

An early West Indian Herpetologist: Antonio Vasquez de Espinosa, 156?-1630. His last work, "Indiae Descriptionem" has been translated by Dr. Charles Upson Clark as "Compendium and Description of the West Indies," Smithsonian Misc. Coll., Vol. 102, Pub. 3646, Sept. 1942, pp. 1-862.

Dr. Clark has made a fine index referring to the 2059 paragraphs in which we can refer to snakes, frogs, lizards, turtles and alligators. In par. 595 we find: "Some (snakes) are dark gray and look like a rotten stick, with four openings at the nostrils . . ." Fra Vasquez was a better naturalist than most of the early explorers.

AMPHIBIANS AND REPTILES OF THE PACIFIC STATES, by Dr. Gayle Pickwell. Published by the Stanford University Press, 1947, 236 pp., 65 plates, 20 figs., $4.00. This book is the last word on the area covered—Washington, Oregon and California. Dr. Pickwell leaves us no further excuse for misusing "poikilothermal" and "homoiothermal" which really signify "variable blood temperature' 'and "constant blood temperature" respectively and not "cold-blooded" and "warm-blooded" as most of us have erroneously thought.

The chapters on taxonomy are treated in such a way that a casual reader will learn the subject unwittingly—and like it. The chapter on life histories is more complete than in any similar work.

The plates grouped in chapter seven are excellent and will serve for identifications without the very workable keys which contain figures for even greater ease. Dr. Pickwell's book is a boon to the student and beginner alike. His generosity and graciousness in the Preface in acknowledging all help received starts one off with a warm feeling of cordiality. C.G.

Herpetological Titles in the "Desert Magazine," 636 State St., El Centro, Cal., Randall Henderson, Editor.

Harmless reptiles of the desert, Cyrus S. Perkins, Apr. '40, p. 22.

Hunting chuckwallas with a camera, Weldon D. Woodson, June '41, p. 31.

Bailey's collared lizard, Weldon D. Woodson, Feb. '44, p. 23.

Horned lizards of the desert, Weldon D. Woodson, Mar. '45, p. 18.

Ways of a desert tortoise, Richard L. Cassell, Dec. '45, p. 25.

On the prowl for reptiles, Ken Stott, Jr., Sept. '46, p. 24.

His hiss is just a bluff (Gopher snake), Richard L. Cassell, Mar. '47.

Preliminary List of the Reptiles of Butler County, Ohio

By GEORGE S. FICHTER

Although Miami University became a functioning institution as long ago as 1824, science was not a part of its curriculum for many years. Hence, Butler County made few contributions to early zoological literature, and field zoology received almost no expression until the past quarter of a century. Until the arrival of Dr. R. A. Hefner in 1925, Dr. M. W. Boesel in 1928, and the men who have followed them, Miami's zoologists were primarily interested in specialties which did not often take them afield. Now there is an increasing amount of attention given to the immediate vicinity with the result that the data and specimens in the museum are increasing to representative size.

Despite the common popularity of reptiles, the information concerning the species in Butler County is despairingly meager. In the Ohio Geological Survey of 1838, Dr. J. P. Kirtland presented a list of the reptiles of Ohio, but he gave no locality records on the specimens taken. It is possible that some of his information might have been taken in Butler County, since Dr. Kirtland taught the theory and practice of medicine at the Medical College of Ohio in Cincinnati. Likewise, various notes in the Journal of the Cincinnati Society of Natural History might have originated from field observations in Butler County, but there is no indication of any extensive work having been done.

The three major works on the reptiles of Ohio have come during the past half century. They are the works of Smith (1882), Morse (1904), and Conant (1938). Morse and Conant made specific reference to specimens collected in Butler County. Conant referred to the Miami University collection. Most such collections have since been displaced, and the specimens are no longer available. The list presented here concerns specimens collected more recently and includes also those species which are not in the collection but which are positively known to be prevalent in relative abundance. In addition, it considers several species which have been found in adjacent counties (Hamilton, Warren, and Montgomery in Ohio and Franklin in Indiana) and might be expected to appear in Butler County.

No records indicate the presence of any venomous reptiles within the boundaries of Butler County. In a history of Warren County, however, there is an account of the prevalence of rattlesnakes in that vicinity. One gentleman, A. H. Dunling, recalled that during the year of 1797 he was taken by his father on a walk to a neighbor's house. The distance was only about one-half mile, but his father killed seven rattlesnakes during the journey without particular search for them. Mr. Dunling remembered the instance vividly because the rattles were later made into a toy which he played with for years afterward. There was no indication which could lead to a definite conclusion as to the species of the snakes. More re-

cently, *Sistrurus catenatus catenatus* has been definitely recorded for Montgomery County (Wood and Duellman, 1947). The closest record for *Agkistrodon mokasen mokasen* is Hamilton County. A specimen taken there by Charles Dury is in the collection of the Cincinnati Society of Natural History.

1. *Sceloporous undulatus* (Latreille)
   No records for Butler County, but they are common in the wooded hills of Franklin County, Indiana, just west of Butler County. Specimens in the MU collection were taken in Franklin County at Brookville on June 1, 1942 (G. S. Fichter). It is also recorded from Hamilton County (Morse, 1904), and there is a specimen in the collection of the Cincinnati Society of Natural History taken in that locality (Conant, 1938).
2. *Eumeces fasciatus* (Linne)
   Rather common. MU collection specimen taken at Reily, Ohio, April 4, 1940 (GSF).
3. *Eumeces laticeps* (Schneider)
   No records for Butler County. MU collection specimen taken in Franklin County, Indiana, at Brookville on June 1, 1942 (GSF). It has also been taken in Hamilton County (Conant, 1938).
4. *Carphophis amoena helenae* (Kennicott)
   No records for Butler County. Recorded from Montgomery County (Wood and Duellman, 1947).
5. *Diadophis punctatus edwardsii* (Merrem)
   Rare. MU collection specimen taken at Reily, Ohio, on April 14, 1946 (GSF). This is the only specimen recorded from the county. Conant (1938) lists it as occurring in Hamilton and Warren Counties, and Wood and Duellman (1947) list it from Montgomery County.
6. *Heterodon contortrix contortrix* (Linne)
   Common. None of the several specimens in the MU collection bear dates or locality records.
7. *Opheodrys vernalis* (Harlan)
   No recent records. Specimen in the U. S. National Museum collection was taken at Monroe, Ohio (Conant, 1938). It has also been recorded from Hamilton County (Morse, 1904).
8. *Coluber constrictor constrictor* (Linne)
   Common. Butler County is within the zone of intergradation with *Coluber c. flaviventris*, and the two are not separable. MU collection specimen taken at Reily, Ohio, on June 28, 1940 (GSF).
9. *Elaphe obsoleta obsoleta* (Say)
   Very common. MU collection specimen is a juvenile taken at Oxford, Ohio, on June 18, 1940 (GSF).
10. *Lampropeltis triangulum triangulum* (Lacepede)
    Common. MU collection specimen taken at Oxford, Ohio, on June 18, 1945 (Paul Daniels).

11. *Natrix kirtlandii* (Kennicott)
Uncommon. MU collection specimen taken at Oxford, Ohio, on May 5, 1942 (GSF).
12. *Natrix septemvittata* (Say)
Very common. MU collection specimen taken at Oxford, Ohio, on May 5, 1942 (GSF).
13. *Natrix sipedon sipedon* (Linne)
Very common. MU collection specimens taken at Reily, Ohio, on May 4, 1940 (GSF) and Oxford Ohio, on October 3, 1945 (PD).
14. *Storeria dekayi* (Holbrook)
No recent records. Specimen in the U. S. National Museum taken at Monroe, Ohio (Conant, 1938). Several recorded from Montgomery County (Wood and Duellman, 1947).
15. *Thamnophis sauritus sauritus* (Linne)
No recent records. Recorded from Hamilton, Ohio (Morse, 1904).
16. *Thamnophis sirtalis sirtalis* (Linne)
Very common. MU collection specimen taken at Reily, Ohio, on June 20, 1940 (GSF).
17. *Sternotherus odoratus* (Linne)
No records for Butler County. Taken in Hamilton County (Conant, 1938) and in Montgomery County (Wood and Duellman, 1947).
18. *Chelydra serpentina serpentina* (Linne)
Common. MU collection specimen taken at Reily, Ohio, on June 21, 1940 (GSF).
19. *Terrapene carolina* (Linne)
Common. MU collection specimen taken at Reily, Ohio, on June 20, 1940 (GSF).
20. *Graptemys geographica* (Le Seuer)
No recent records. Specimens in the collection of the Toledo Zoological Society taken at Westchester, Ohio (Conant, 1938). Also recorded from Montgomery County recently (Wood and Duellman, 1947).
21. *Chrysemys belii marginata* (Agassiz)
Rather common. MU collection specimen taken at Reily, Ohio, on October 12, 1940 (GSF).
22. *Amyda spinifera spinifera* (Le Seuer)
Common. No specimens in the MU collection.

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* * * *

Meeting of the Herpetologists League

The second meeting of the Herpetologists League, in conjunction with the Ecological Society of America, will be at 2:00 P.M., Dec. 29th, 1947 at the Congress Hotel, Chicago. Dr. Hobart M. Smith will act as Chairman during our session. There will be papers by Mr. W. L. Burger, Mr. C. William Nixon, Dr. Albert M. Reese, Mr. Philip W. Smith and Dr. Hobart M. Smith.

Your name will appear on the official program of the American Association for the Advancement of Science if you send them the registration fee of $2.00 to 1515 Mass. Ave. N.W., Washington, D.C.

* * * * *

Excerpts from "Lacerta," the herpetological monthly of the Netherlands, Vier Heemskinderen Str. 159, The Hague, Holland. Vol. 5, No. 11, Aug. 1947.

p. 81. *Phrynosoma cornutum* (Harlan), A. Th. Reijst. Habits; food.

p. 84. Exposure of reptiles to ultraviolet rays, D. J. van der Laan.

p. 85. Amphibians and science, J. Th. ter Horst. Use of *Xenopus laevis* Daudin, for pregnancy reactions.

p. 90. *Bufo calamita* Laur., A. W. Kleywegt. Habits, voice, reproduction.

p. 91. *Ophisops elegans* Menetries, A. Th. Reyst. Eyes, habitat.

p. 92. Review of "Reptilien en amphibieen," Dr. W. M. Kruseman and R. Tolman.

Doubtful Type Localities in South Carolina

By WILFRED T. NEILL

The type of *Natrix fasciata pleuralis* Cope was stated to have been U.S.N.M. No. 1092, from "Mississippi" (Cope, Proc. U. S. Nat. Mus. 14, 1892: 672). However, Clay, redescribing the form of *N. sipedon pleuralis*, noted that No. 1092 does not fit the description and is a *fasciata* recorded in the accession catalog as from Fort Morgan, Alabama, a locality beyond the range of *pleuralis* (Copeia 4, 1938: 179). Clay further noted that in the same bottle with No. 1092 is another specimen bearing an old and faded label that seems to read "1080 *Nerodia fasciata* B. & G. Summerville, S. C." This is presumably a *pleuralis*, since Clay suggested that it may have been the actual type of Cope's form. Subsequent issues of the Checklist have given the type locality of *pleuralis* as "probably Summerville, South Carolina." This would indicate the town of that name in Dorchester County, since recent atlases list no other Summerville in the state.

Many years of collecting have indicated that *Natrix sipedon pleuralis* does not enter the Coastal Plain in the area between Macon, Georgia, and Columbia, South Carolina. The Piedmont race meets *N. s. fasciata* at the Fall Line with no overlapping and little evidence of intergraduation (Neill, Copeia 4, 1946: 255). The occurrence of *pleuralis* in Dorchester County, in the lower Coastal Plain, is improbable. More to the point, I have collected extensively in this area, taking a goodly number of banded water snakes, all of which were typical *fasciata*. Even the fortuitous duplication of *pleuralis* characters is unlikely here. If No. 1080 is a *pleuralis*, it must have been collected elsewhere.

A possible explanation is afforded by examination of Cope's later work, "The Crocodilians, Lizards, and Snakes of North America" (Ann. Rep. U. S. Nat. Mus. 1898, 1900). This book contains references to No. 1142 from Somerville, South Carolina; Nos. 1184, 1612, 7302, 787, and 984 from Somerville, North Carolina; and Nos. 5158 and 4212 from Summerville, North Carolina. All these specimens, however, were collected by the same person, J. C. McNair, thus suggesting that the three localities are in reality one. Also listed from Somerville, North Carolina, are Nos. 6473 and 2146, no collector given; and No. 2330, collected by Dr. F. B. Hough. The correct locality is apparently a North Carolina one; and all the above specimens are of forms that might be expected in the vicinity of the present Summerville, Harnett County, North Carolina. The South Carolina record may have been a *lapsus calami* duplicated in the case of No. 1080.

However, there may have been a Summerville (or Somerville) that is no longer extant, in either of the Carolinas; or, Cope may have had a Mississippi specimen, incorrectly numbered. Accordingly, I suggest that the type locality of *Natrix sipedon pleuralis* Cope be considered unknown.

Another dubious type locality is that of *Hyla andersonii* Baird (Proc. Acad. Nat. Sci. Phila. 7, 1854: 60). The original specimen was recorded from Anderson, Anderson County, South Carolina, and was one of many reptiles and amphibians sent to the U. S. National Museum by Miss Charlotte Paine, later Mrs. M. E. Daniels. I have previously expressed the opinion that Anderson was merely the shipping point for many of these specimens (Copeia, 3, 1947: 208). Among the species supposedly taken at Anderson were, in addition to *H. andersonii,* such lowland forms as *Elaphe confinis, Farancia a. abacura,* and *Bufo t. terrestris.* Such an assemblage would scarcely be found only about 30 miles from the Appalachian Mountains. All available records of *H. andersonii,* other than that of the type, point to its being a Coastal Plain species.

In November, 1940, I collected an adult *H. andersonii* in the dense swamp bordering McBean Creek, a Coastal Plain tributary of the Savannah River, near McBean, Richmond County, Georgia. This seems to be the first Georgia record, as well as the closest record to Anderson. It is also the first notice of the species in the Savannah River valley in recent times. However, I do not believe the form will be found to range up the river as far as Anderson. At least 18 species of amphibians and 15 of reptiles meet the inlandmost limit of their distribution in Richmond County, and give no indication of following the valley northward above Augusta. I suggest that the type locality of *Hyla andersonii* be considered unknown.

Anderson was also the type locality of *Scotophis confinis* Baird and Girard (Cat. N. Amer. Rept. I, 1853: 76), currently listed as *Elaphe obsoleta confinis* or *Elaphe confinis.* Here the situation is complicated by the uncertain status of the gray rat snake, which maintains its identity in some areas, but shades into *obsoleta* or into *quadrivittata* in others. I discussed some taxonomic aspects of this problem in an article prepared in 1946 (*op. cit.*). Since then I have investigated the Anderson region rather thoroughly, and questioned several local amateur herpetologists. It now seems almost certain that, if the type of *confinis* really came from Anderson, it was nothing more than an *obsoleta.* Dr. Coleman Goin has recently called my attention to the fact that the type specimen of *confinis* was a juvenile less than 17 inches in length; and consequently it will never be possible to say whether it was an *obsoleta* or a *confinis,* since the young of these forms are indistinguishable. Thus the name *confinis* seems of very dubious application to the light gray spotted rat snakes of the Atlantic and Gulf Coastal Plains. It is tenable only under the assumption that Miss Paine's specimen was actually collected elsewhere than Anderson, as could well have been the case.

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Polychromatism in Phrynosoma

By CHARLES H. LOWE, JR.

Individuals of local populations of three species of horned lizards, *Phrynosoma modestum, P. cornutum,* and *P. douglassii hernandesi,* were collected with sand substrate samples, in Socorro County of south-central New Mexico in August, 1947. In each case the sand sample was taken from the spot upon which the lizard was first observed. Polychromatism was marked in all three forms and varied geographically in local populations as the color of the substratum varied.

Of 14 individuals of *cornutum,* 9 of *modestum* and 2 of *douglassii,* none was found on a substratum which was not closely matched by the dorsal ground color of the animal. Correspondence between the dorsal ground color and the background was particularly striking in *P. modestum.* This phenomenon in populations of New Mexico is the same as that found in local populations of the polychromatic *P. p. platyrhinos* and *P. coronatum* in California. Several dozen specimens of *P. platyrhinos,* with marked variation in dorsal coloration, when checked with their immediate background colors were found to match them very closely. Perhaps the precision of the color-matching phenomenon in this lizard genus is not as striking as its consistency. I have never seen an individual of any of the species of *Phrynosoma,* the dorsal ground color of which did not match to a fair degree the color of the substratum upon which it was found. To be sure, most of the species and subspecies do not run the gamut of color found in *P. modestum* and *P. platyrhinos,* but so far as I am aware, background-matching is present in all.

It is hardly conceivable that selection has not played a role in the development of this striking phenomenon. To those familiar with the behavior and ecology of horned lizards, the survival value of soil color-matching to these animals is apparent.

From the above facts it is inferred that the polychromatism present in the several species of *Phrynosoma* has a selective coefficient greater than zero, being, therefore, something more than neutral with regard to survival value. Such development of a high degree of body and substratum color-matching is most conceivable in an organism which is sedentary in habit, and least so in a form given to "aimless" wandering. It is indicated, therefore, that horned lizards are distinctly localized in their normal movements. Marking experiments of populations in the field are required to determine the validity of this assumption. The attendant problems involved in the polychromatism of horned lizards present an area for desirable experimental study, particularly from the viewpoint of population structure, gene-flow between local populations, and related considerations of speciation.

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Heterodon nasicus nasicus in Indiana

By ALBERT G. SMITH *and* M. B. MITTLEMAN

Faunal lists have, for over fifty years, included two species of hog-nosed snakes, *Heterodon c. contortrix* and *Heterodon simus,* as occurring in the state of Indiana. The junior author, in another paper now in press, has advanced a number of reasons for deleting *simus* from the herpetofauna of Indiana. However, it now appears that two species of *Heterodon* do occur in this state, namely: *Heterodon c. contortrix* and *Heterodon n. nasicus* (Baird and Girard), a typical plains form.

In 1925, Mr. Harry Folger, at that time associated with the Indiana Department of Conservation, presented two *Chrysemys b. marginata* and a small *Heterodon,* identified as *contortrix,* to the University of Michigan Museum of Zoology. The specimens were taken along Wolf Creek in Bartholomew County, Indiana. Some years later, Dr. Joseph R. Bailey had occasion to check the *Heterodon* specimen, and, considering it to be a valid *nasicus,* called it to the senior author's attention.

The specimen, U. M. M. Z. 63125, is a male with 23 dorsal scale rows at midbody (23-23-21-19), 138 ventrals, 48 subcaudals, 8 upper and 10 lower labials, total length 309 mm., tail length 51 mm. The dorsal surface has 35 blotches from the nape to the level of the vent, and a large amount of black suffuses the belly. It thus differs from *contortrix* of the same region, which is characterized by a normal scale count of 25 rows at midbody, and not more than 30 dorsal blotches up to the level of the vent. *H. c. contortrix* differs also by virtue of having little or no black on the venter. The Indiana *nasicus* differs from the two specimens of *simus* (U.S.N.M., 4834, Brookville, Franklin County, Indiana) reputedly from this state in its lesser number of dorsal scale rows, higher ventral and caudal count, and the greater number of dorsal blotches. (cf Mittleman, *in press.)*

Two explanations may be advanced to account for the occurrence of this snake in Indiana: first, that it represents an escaped or liberated specimen fortuitously captured; second, that it constitutes yet another instance of the use of stream valleys through which plains forms have entered and established themselves in the "Prairie Peninsula." Wolf Creek is a relatively small stream which empties into the east fork of the White River. The White River is, in turn, a tributary of the Wabash, which flows into the Ohio River. As outlined by Transeau (1935, Ecology, *16,* no. 4: map), the Prairie Peninsula extends along the northern side of the Ohio River, and is particularly in evidence about the streams of southern Indiana. It seems quite possible that the occurrence of *nasicus* in Indiana is explainable in the light of migration along the Prairie Peninsula, and its adjacent drainage system.

Although we are inclined to support this latter postulate, we do not totally discredit the first possibility, at least until additional specimens are found. There is little chance of an error in the locality data, since Mr. Folger is a professional zoologist.

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Distribution of Three Amphibians and a Reptile in the Midsouth

By MALCOLM V. PARKER

Recently the author had opportunity to examine various herpetological publications that have come out in the past six years, and notes that several forms are omitted from the fauna of northern Mississippi and western Tennessee. This is doubtless due partly to certain material not being generally known, as most of it is in the author's private collection. The following records and observations are therefore considered worthy of publication. It has not been possible to make a complete search of the literature.

1. *Ambystoma maculatum* (Shaw)

The western Tennessee range of this species as mapped by Bishop (1943) included only the border of the state along the Mississippi River. A specimen has been collected near Pickwick Landing, Hardin County, Tennessee.

2. *Eurycea bislineata cirrigera* (Green)

This salamander occurs in northwestern DeSoto County, Mississippi, about a hundred miles beyond the range indicated by Bishop (1943) and Maldonado-Koerdell and Firschein (1947).

3. *Acris gryllus* (LeConte)

Louisiana seems to be the generally accepted northern limit of the Mississippi Valley range of this frog. However, the call has been noted and specimens have been collected at upland ponds on both sides of the Mississippi-Tennessee state boundary south of Memphis; and in the upland streams and ponds elsewhere in Shelby County, Tennessee. *Acris crepitans* Baird sometimes occurs in the same localities, occasionally only a few yards from *gryllus,* but the two species very rarely intermingle.

In a personal communication, Mr. Glenn Gentry stated that a published record for *Acris gryllus* in Tennessee (Shoup, Peyton, and Gentry, 1941) was actually based on specimens of *Acris crepitans.*

4. *Lampropeltis calligaster* (Harlan)

The range given by Stejneger and Barbour (1943) omits Tennessee, but specimens have been received from Madison County (Parker, 1939) and Chester County, Tennessee.

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Hibernation of Lizards in Western Texas

By CHARLES C. BOWERS *and* HOBART M. SMITH

Hibernation of lizards in extreme western United States has received rather extensive study, but observations upon the phenomenon elsewhere in the country are few. During the Christmas holidays of 1946, in the environs of El Paso, Texas, Bowers made an attempt to discover the winter habitat of lizards of that area, and we record the results herewith.

Lizards are extremely abundant in this area during most of the year, but as cold weather approaches in late October they disappear and usually are not seen again until spring. In many parts of southern Texas the lizards are known to retire only to superficial depths, as they can be found in moderate abundance under logs, stones and similar objects. This is not the case about El Paso. Large numbers of stones and other surface litter were turned on Mt. Franklin during the period of investigation, without revealing the presence of a single reptile.

Two rocky locations were selected for digging operations. One was a refuse dump, the other a canyon. In both places large numbers of lizards had been seen on summer days. The excavation was difficult, but was carried to a depth of about three feet in six different places, and to lesser depths in numerous other spots, all without success. Apparently in such rocky areas the lizards follow the crevices to still greater depths.

The only other area tested was in the sand dune belt a few miles west of El Paso. In about eight hours of digging seven lizards were found, all about the bases of bushes where the sand had accumulated to depths of three to ten feet. Numerous small holes were observed leading into small tunnels that in turn often led into larger burrows that were presumably the work of small mammals. However the lizards were never found in the burrows; they were always a short distance to one side, although usually close to the walls of a tunnel. It appeared that they may have entered the cavity and then buried themselves to one side. Although the digging was carried out to depths of three feet, all specimens were about one foot from the surface. When discovered they were too cold to move; about a full minute was required for them to warm up sufficiently to move slightly, and ten minutes to restore some degree of activity. The air temperature at the time was 60° F.

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